

**WHAT IS CLAIMED IS:**

1 1. A method implemented in a computer program to provide a map of site-specific  
2 amounts of a soil nutrient to be applied in fertilizer to an agricultural field divided into sites,  
3 the method comprising:

4 calculating for the field, from a map of site-specific field characteristic data for the  
5 field, a map for the field of site-specific amounts of the soil nutrient needed to produce at  
6 each site a maximum possible crop yield; and

7 subtracting, from the site-specific soil nutrient amounts for maximum yield for the  
8 field, site-specific measures of the soil nutrient existing in the field, thereby producing a map  
9 of site-specific amounts of the soil nutrient to be applied in fertilizer to the field.

1 2. The method of claim 1, wherein the field characteristic is a measure of biomass  
2 produced by the field in one or more past growing seasons.

1 3. The method of claim 2, further comprising:

2 calculating, from a map of site-specific image data taken of the field during one or  
3 more past growing seasons, a map of site-specific measures of a leaf area index, the leaf area  
4 index serving as the measure of biomass produced by the field.

1 4. The method of claim 2, further comprising:

2 calculating, from a map of site-specific image data taken of the field during one or  
3 more past growing seasons, a map of site-specific measures of a vegetation index, the  
4 vegetation index serving as the measure of biomass produced by the field.

1 5. The method of claim 1, further comprising:

2 calculating, from a topographic map for the field, a map of site-specific measures of a  
3 soil wetness index, the wetness index serving as the field characteristic.

1 6. The method of claim 1, wherein the soil nutrient is nitrogen.

1 7. The method of claim 1, wherein the soil nutrient is phosphorous.

1 8. The method of claim 1, wherein the soil nutrient is potassium.

1 9. The method of claim 1, wherein the soil nutrient is organic fertilizer.

1 10. The method of claim 9, wherein the organic fertilizer is manure.

1 11. The method of claim 1, wherein the soil nutrient is a micronutrient.

1 12. The method of claim 11, wherein the micronutrient is Zn.

1 13. The method of claim 11, wherein the micronutrient is Fe.

1 14. The method of claim 1, further comprising:

2 calculating for the field, from a map of site-specific image data taken of the field in a  
3 bare soil state, a map of site-specific measures of soil brightness; and

4 calculating the site-specific measures of the soil nutrient existing in the field from at  
5 least the map of site-specific measures of soil brightness.

1 15. The method of claim 1, wherein the site-specific measures of the soil nutrient existing  
2 in the field are calculated from at least a map of site-specific measure of soil electrical  
3 conductivity.

1 16. A method implemented in a computer program to provide a map of site-specific  
2 amounts of a soil nutrient to be applied in fertilizer to an agricultural field divided into sites,  
3 the method comprising:

4 calculating for the field, from a map of site-specific measures of the biomass of one  
5 or more past crops grown in the field, a map for the field of site-specific amounts of the soil  
6 nutrient needed to produce at each site a maximum possible crop yield;

7 calculating for the field, from a map of site-specific image data taken of the field in a  
8 bare soil state, a map of site-specific measures of soil brightness;

9 calculating site-specific measures of the soil nutrient existing in the field from at least  
10 the map of site-specific measures of soil brightness;

11 subtracting, from the site-specific soil nutrient amounts for maximum yield for the  
12 field, site-specific measures of the soil nutrient existing in the field, thereby producing a map  
13 of site-specific amounts of the soil nutrient to be applied in fertilizer to the field.

17. The method of claim 16, wherein the soil nutrient is nitrogen.

18. The method of claim 16, wherein the soil nutrient is phosphorous.

19. The method of claim 16, wherein the soil nutrient is potassium.

20. The method of claim 16, wherein the soil nutrient is organic fertilizer.

21. The method of claim 16, wherein the soil nutrient is a micronutrient.

22. A computer program, residing on a computer-readable medium, for providing a map of site-specific amounts of a soil nutrient to be applied in fertilizer to an agricultural field divided into sites, the computer program comprising instructions for causing a computer to:  
calculate for the field, from a map of site-specific field characteristic data for the field, a map for the field of site-specific amounts of the soil nutrient needed to produce at each site a maximum possible crop yield; and

subtract, from the site-specific soil nutrient amounts for maximum yield for the field, site-specific measures of the soil nutrient existing in the field, thereby producing a map of site-specific amounts of the soil nutrient to be applied in fertilizer to the field.

23. The computer program of claim 22, wherein the field characteristic is a measure of biomass produced by the field in one or more past growing seasons.

24. The computer program of claim 23, wherein the instructions further cause the computer to:

calculate, from a map of site-specific image data taken of the field during one or more past growing seasons, a map of site-specific measures of a leaf area index, the leaf area index serving as the measure of biomass produced by the field.

25. The computer program of claim 23, wherein the instructions further cause the computer to:

calculate, from a map of site-specific image data taken of the field during one or more past growing seasons, a map of site-specific measures of a vegetation index, the vegetation index serving as the measure of biomass produced by the field.

1 26. The computer program of claim 22, wherein the instructions further cause the  
2 computer to:

3 calculate, from a topographic map for the field, a map of site-specific measures of a  
4 soil wetness index, the wetness index serving as the field characteristic.

1 27. The computer program of claim 22, wherein the soil nutrient is nitrogen.

1 28. The computer program of claim 22, wherein the soil nutrient is phosphorous.

1 29. The computer program of claim 22, wherein the soil nutrient is potassium.

1 30. The computer program of claim 22, wherein the soil nutrient is organic fertilizer.

1 31. The computer program of claim 22, wherein the soil nutrient is a micronutrient.

1 32. The computer program of claim 22, wherein the instructions further cause the  
2 computer to:

3 calculate for the field, from a map of site-specific image data taken of the field in a  
4 bare soil state, a map of site-specific measures of soil brightness; and

5 calculate the site-specific measures of the soil nutrient existing in the field from at  
6 least the map of site-specific measures of soil brightness.

1 33. The computer program of claim 22, wherein the instructions cause the site-specific  
2 measures of the soil nutrient existing in the field to be calculated from at least a map of site-  
3 specific measure of soil electrical conductivity.